

$$\begin{aligned}\sin 130^\circ &\Rightarrow \sin(\frac{\pi}{4} + \frac{\pi}{6}) \rightarrow +\cos \frac{\pi}{6} \\ \sin 210^\circ &\Rightarrow \sin(\frac{5\pi}{6} + \frac{\pi}{6}) \rightarrow -\cos \frac{\pi}{6} \\ \cos 130^\circ &\Rightarrow \cos(\frac{\pi}{4} + \frac{\pi}{6}) \rightarrow -\sin \frac{\pi}{6} \\ \cos 150^\circ &\Rightarrow \cos(\pi - \frac{\pi}{6}) \rightarrow -\cos \frac{\pi}{6}\end{aligned}$$

$$(\cos 40^\circ - \cos 30^\circ)(\sin 40^\circ - (-\cos 30^\circ))$$

$$(\frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2})(\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}) \Rightarrow \frac{2}{4} - \frac{3}{4} \Rightarrow \left(-\frac{1}{4}\right) \checkmark$$

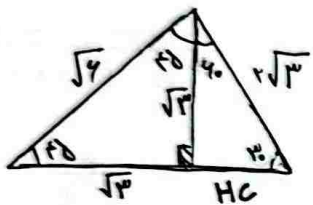
(۲) ① الف

$$\tan(210^\circ) \rightarrow \tan(\pi + 180^\circ) = \frac{\tan \pi + \tan 180^\circ}{1 - \tan \pi \tan 180^\circ} = \frac{1}{\sqrt{3}}$$

② (ب)

$$\begin{aligned}\cos(330^\circ) &\rightarrow \cos(2\pi - 30^\circ) \Rightarrow +\cos 30^\circ \rightarrow \frac{\sqrt{3}}{2} \\ \cos(225^\circ) &\rightarrow \cos(\pi + 45^\circ) \Rightarrow -\cos 45^\circ \rightarrow -\frac{\sqrt{2}}{2}\end{aligned}$$

$$\frac{1 + 3\left(\frac{1}{\sqrt{3}}\right)^2}{3\left(\frac{\sqrt{3}}{2}\right)^2 + 2\left(-\frac{\sqrt{2}}{2}\right)^2} \Rightarrow \frac{2}{3 + 1} \Rightarrow \left(\frac{1}{2}\right) \checkmark$$

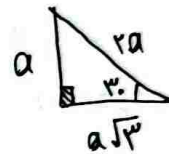


$$a\sqrt{2} = \sqrt{4} \rightarrow a = \sqrt{2}$$

$$HC = a\sqrt{3} \Rightarrow \sqrt{2} \times \sqrt{3} = \frac{2}{\sqrt{3}}$$

$$HC = 2 \checkmark$$

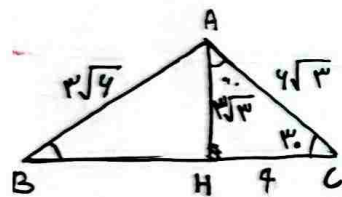
(۲) سوال ۲



$$a\sqrt{3} = 4 \rightarrow a = \frac{4}{\sqrt{3}} \xrightarrow{\text{ضرب در 3}} 4\sqrt{3}$$

$$AH = a \Rightarrow 4\sqrt{3}$$

$$\sin B = \frac{4\sqrt{3}}{8\sqrt{3}} = \frac{1}{2} = \frac{\sqrt{2}}{2} \Rightarrow B = 45^\circ \checkmark$$

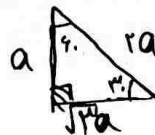


$$a\sqrt{3} = 8 \cdot \sqrt{3} \Rightarrow a = 8 = BD$$

$$BC = 8 + 8$$

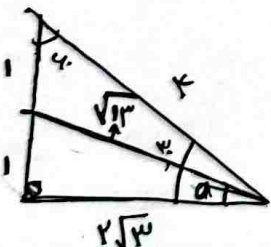
$$AC = 2 \times 8 \cdot \sqrt{3} = 16\sqrt{3} \Rightarrow \sin \alpha = \frac{8\sqrt{3}}{16\sqrt{3}} = \frac{1}{2}$$

$$BC = a\sqrt{3} \xrightarrow{I} 16\sqrt{3} = 8 + 8 \Rightarrow \alpha = 100^\circ \checkmark$$



سوال ۳

(۲)



$$\sin \alpha = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3} \checkmark$$

$$\frac{BC}{\sin A} = \frac{AC}{\sin B} = \frac{AB}{\sin C}$$

سوال ۴

(۲)

$$\frac{AB}{AC} = \frac{\sin C}{\sin B} = \frac{\sin(45^\circ + 30^\circ)}{\sin 30^\circ} = \frac{\frac{\sqrt{2} + \sqrt{2}}{2}}{\frac{1}{2}} = \frac{\sqrt{2} + \sqrt{2}}{1} \checkmark$$

$$\sin(45^\circ + 30^\circ) \rightarrow \sin 45^\circ \cos 30^\circ + \cos 45^\circ \sin 30^\circ \Rightarrow \frac{\sqrt{2}}{2} \times \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2} \times \frac{1}{2} \rightarrow \frac{\sqrt{2} + \sqrt{6}}{4}$$

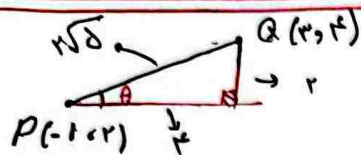
$$\frac{SABE}{SBCD} \Rightarrow \frac{\frac{1}{r} \sin B \times r \times r}{\frac{1}{r} \sin B \times r \times y} = \frac{1}{1/\lambda} = \frac{r}{q} \checkmark$$

(2) سؤال ٥

ا) $r(\frac{1}{r} \sin 120^\circ \times r \times r) = r(\frac{1}{r} \times \frac{\sqrt{3}}{2} \times r \times r) \rightarrow 4\sqrt{3} \checkmark$

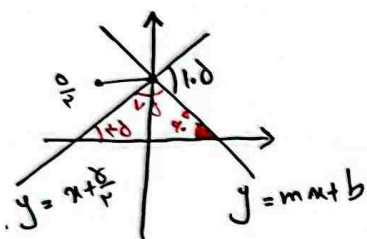
(2) سؤال ٩

ب) $\frac{1}{r} \sin 120^\circ \times r \times r \Rightarrow \frac{1}{r} \times \frac{\sqrt{3}}{2} \times r \times r \rightarrow 3\sqrt{3} \checkmark$



$$\cos \theta = \frac{r}{r\sqrt{8}} \Rightarrow \frac{r}{\sqrt{8}} \times \frac{\sqrt{8}}{\sqrt{8}} \Rightarrow \frac{r\sqrt{8}}{8} \checkmark$$

(2) سؤال ١٧



$$\tan 60^\circ = 1$$

$$m = \tan \theta \Rightarrow \underline{m = 1}$$

(2) سؤال ١٨

$$m \times b = \frac{\sqrt{3}}{2} \checkmark$$

$$b = \frac{\sqrt{3}}{2}$$

$$\cos(\pi + \alpha) \rightarrow -\cos \alpha \quad f(\alpha) = -\cos \alpha + \cos \alpha - (-\cot \alpha) \Rightarrow \underline{\cot \alpha}$$

$$\sin(\frac{\pi}{2} - \alpha) \rightarrow +\cos \alpha$$

$$\tan(\frac{\pi}{2} + \alpha) \rightarrow -\cot \alpha$$

$$f(\alpha) = \cot \alpha \xrightarrow{f(\frac{3\pi}{4})} \cot(135^\circ) \Rightarrow -\sqrt{3} \checkmark$$

(2) سؤال ٩١

$$\frac{D}{4} = \frac{D}{1/\lambda} \rightarrow \underline{D = 10^\circ}$$

$$\frac{\sin(\frac{\pi}{2} + \alpha) + \cos(\frac{3\pi}{2} - \alpha)}{\cos(\pi + \alpha) - \sin(-\alpha)} = \frac{\cos(\alpha) - \sin(\alpha)}{-\cos(\alpha) + \sin(\alpha)} = -1 \checkmark$$

(2) سؤال ١٠١